GATE DIELECTRIC AND METHOD THEREFOR

Abstract of the Disclosure

A transistor device has a gate dielectric with at least two layers in which one is hafnium oxide and the other is a metal oxide different from hafnium oxide. Both the hafnium oxide and the metal oxide also have a high dielectric constant. The metal oxide provides an interface with the hafnium oxide that operates as a barrier for contaminant penetration. Of particular concern is boron penetration from a polysilicon gate through hafnium oxide to a semiconductor substrate. The hafnium oxide will often have grain boundaries in its crystalline structure that provide a path for boron atoms. The metal oxide has a different structure than that of the hafnium oxide so that those paths for boron in the hafnium oxide are blocked by the metal oxide. Thus, a high dielectric constant is provided while preventing boron penetration from the gate electrode to the substrate.